

Zhihao Tao

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Research Interests

- **Wireless System Designs**
 - 5G&6G, wireless sensing and communications, transceiver designs, PHY layer, Massive MIMO, OFDM, etc.
- **Digital Signal Processing**
 - Statistical signal processing, optimum signal processing, detection and estimation theory
- **AI for Signal Processing and Wireless**
 - Develop efficient machine learning and deep learning algorithms for signal processing and wireless systems

Education

- **Rutgers University–New Brunswick, NJ, USA** **September 2022– October 2026**
Dept. of Electrical and Computer Engineering **Ph.D. in Signal and Information Processing**
 - Advisor: [Prof. Athina Petropulu](#)
 - GPA: 3.93/4.0
 - Core courses include Reinforcement Learning, Deep Learning, AI in Decision Making, Stochastic Processes, Optimum Signal Processing, Advanced Digital Signal Processing, Digital Communication, Matrix Theory, etc.
- **Nanjing University, Nanjing, China** **September 2018–June 2021**
School of Electronic Science and Engineering **M.Eng. in Communication and Information Systems**
 - Outstanding Graduate Award, Class of 2021
 - Research-Based, Thesis-Track Master’s Program
- **Sichuan University, Chengdu, China** **September 2014–June 2018**
College of Electronics and Information Engineering **B.Eng. in Electronics and Information Engineering**
 - GPA: 3.67/4.0 Overall Score: 88.8/100
 - Outstanding Graduate Award, Class of 2018
 - Core courses include Modern Communication Theory, Microwave and Antenna Theory, RF Communication Circuit, Computer Communication and Networks, Digital Signal Processing, Signals and Systems, C/C++/Matlab, etc.

Employment

- **Marvell Technology, Santa Clara, CA, USA** **June 2025– August 2025**
 - Job Title: DSP Architecture Intern
 - Job Responsibilities: Developed electrical channel analysis tools and signal processing techniques based on IEEE Std 802.3 Channel Operating Margin (COM)
- **AltoBeam Inc., Beijing, China** **March 2022–August 2022**
 - Job Title: Wireless System Engineer
 - Job Responsibilities: Design and develop wireless communications and signal processing algorithms for next-generation low-energy Bluetooth systems

Publications

- [1] **Z. Tao** and A. Petropulu, “Meta-Learning-Driven GFlowNets for 3D Directional Modulation in Mobile Wireless Systems”, *IEEE International Conference on Communications 2026 (ICC’26)*, Glasgow Scotland, UK, May 2026. [\[PDF\]](#)
- [2] **Z. Tao**, A. Petropulu, and H. Vincent Poor, “Time-Modulated Intelligent Reflecting Surfaces for Integrated Sensing, Communication and Security: A Generative AI Design Framework”, accepted, *Nature Portfolio Journal, npj Wireless Technology, the special issue on ISAC*, April 2026. [\[PDF\]](#)

- [3] **Z. Tao** and A. Petropulu, “Secure Time-Modulated Intelligent Reflecting Surface via Generative Flow Networks”, *IEEE MILCOM 2025*, Los Angeles, CA, Oct. 2025. [\[PDF\]](#) [\[CODE\]](#)
- [4] **Z. Tao** and A. Petropulu, “Antenna Selection for Enhancing Privacy in Radar-Based Vital Sign Monitoring Systems,” in *Proceedings of the 2025 IEEE International Radar Conference (RADAR’25)*, Atlanta, GA, May 2025. [\[PDF\]](#)
- [5] **Z. Tao** and A. Petropulu, “On the Security of Directional Modulation via Time Modulated Arrays Using OFDM Waveforms,” *IEEE Trans. Wireless Commun.*, vol. 24, no. 11, Nov. 2025. [\[PDF\]](#)
- [6] **Z. Tao** and A. Petropulu, “Enhancing Privacy in Radar-Based Vital Sign Monitoring via Non-linear FMCW Waveforms,” in *Proceedings of the 2025 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP’25)*, Hyderabad, India, Apr. 2025. [\[PDF\]](#)
- [7] **Z. Tao**, Z. Xu, and A. Petropulu, “How Secure Is the Time-Modulated Array-Enabled OFDM Directional Modulation?” in *Proceedings of the 2024 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP’24)*, Seoul, Korea, Apr. 2024. [\[PDF\]](#)
- [8] **Z. Tao**, Z. Xu, and A. Petropulu, “Enhance Security of Time-Modulated Array-Enabled Directional Modulation by Introducing Symbol Ambiguity,” *arXiv:2310.09922*, Jun. 2023. [\[PDF\]](#)
- [9] **Z. Tao** and S. Wang, “Improved Downlink Rates for FDD Massive MIMO Systems through Bayesian Neural Networks-Based Channel Prediction,” *IEEE Trans. Wireless Commun.*, vol. 21, no. 3, pp. 2122–2134, Mar. 2022. [\[PDF\]](#)
- [10] **Z. Tao** and S. Wang, “How Often Do We Need to Estimate Wireless Channels in Massive MIMO with Channel Aging?” in *Proceedings of the IEEE Global Communications Conference 2021 (GLOBECOM’21)*, Madrid, Spain, Dec. 2021. [\[PDF\]](#)
- [11] **Z. Tao**, T. Wang, and S. Wang, “Improve Downlink Rates of FDD Massive MIMO Systems by Exploiting CSI Feedback Waiting Phase,” in *Proceedings of the IEEE Global Communications Conference 2019 (GLOBECOM’19)*, Big Island, HI, USA, Dec., 2019. [\[PDF\]](#)
- [12] H. Gong, Q. Ai, **Z. Tao**, and Y. Zhang, “A Causal Information-Flow Framework for Unbiased Learning-to-Rank”, *IEEE Conference on Artificial Intelligence 2026 (IEEE CAI’26)*, Granada, Spain, May 2026. [\[PDF\]](#)
- [13] S. Xiang, **Z. Tao**, K. Wang, A. Petropulu, and M. Zhu, “Residual Deep Lattice Regression for Sparse Multi-Channel DAC Bias Calibration in Beamforming Systems”, accepted, *2026 IEEE International Conference on Intelligent Systems and Interdisciplinary Applications*, Montclair, New Jersey, USA, July 2026.

Patents

- [1] A. Petropulu and **Z. Tao**, “Enhancing Privacy in Radar-Based Vital Sign Monitoring,” US Patent, Under application, 2024.
- [2] S. Wang and **Z. Tao**, “Channel Prediction-Aided FDD Massive MIMO Systems Based on Bayesian Neural Networks,” Nanjing University, China Patent, No. 2020112065996, 2021.

Selected Honors and Awards

07/2026	2025–2026 Award for Outstanding Overseas Study Elite (\$6,000), awarded by China Scholarship Council
09/2025	Rutgers ECE Development and Research Excellence Award
08/2025	Sole Winner, 2025 Marvell Global Intern Innovation Sprint
03/2025	Research & Conference Travel Award, Rutgers School of Graduate Studies
02/2025	Nokia Bell Labs Scholarship (\$10,000), see the news
05/2022	Outstanding Master’s Thesis Award, Nanjing University
11/2020	First-Class Academic Scholarship for Graduate Students, Nanjing University
12/2019	Second-Class Academic Scholarship for Graduate Students, Nanjing University
12/2019	Third Prize, “HUAWEI Cup” 16 th China Graduate Mathematical Contest in Modeling
12/2018	First-Class Academic Scholarship for Graduate Students, Nanjing University
06/2018	Outstanding Undergraduate Thesis Award, Sichuan University
11/2015	National Scholarship, awarded by Ministry of Education of China
10/2015	Second Prize, Mathematical Contest in Modeling, Sichuan University
10/2015	Second Prize, 7 th National Mathematics Competition for College Students (Non-Mathematics Category)

Teaching Assistant

Digital Signal Processing (Undergrad, Spring 2026, Rutgers University–New Brunswick)

Introduction to Deep Learning (Undergrad & Grad, Spring 2025, Rutgers University–New Brunswick)

Sustainable Energy (Undergrad, Fall 2023, Rutgers University–New Brunswick)

Probability and Stochastic Processes (Undergrad, Spring 2023, Rutgers University–New Brunswick)

Mobile Communications (Undergrad, Spring 2019, Nanjing University)

Reviewer

IEEE Communications Magazine

IEEE Journal of Selected Topics in Signal Processing

IEEE Journal on Selected Areas in Communications

IEEE Journal of Selected Topics in Electromagnetics, Antennas and Propagation

IEEE Transactions on Cognitive Communications and Networking

IEEE Transactions on Signal Processing

IEEE Transactions on Wireless Communications

IEEE Transactions on Communications

IEEE Wireless Communications Letters

IEEE Communications Letters

IEEE International Conference on Computer Communications (INFOCOM)

IEEE International Joint Conference on Neural Networks (IJCNN)

IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)

IEEE International Symposium on Biomedical Imaging (ISBI)

IEEE-EMBS International Conference on Biomedical and Health Informatics (IEEE-EMBS BHI)

IEEE Radar Conference

Skills and Languages

Programming: PyTorch, Matlab, Python, C/C++

Language: English (Fluent), Chinese (Native)